

The timetable the 167th ISIJ Meeting

	March 21 (Fri)		March 22 (Sat)		March 23 (Sun)		
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	
Room1 W521	Phenomena in packed bed of blast furnace /Young engineer session of ironmaking [1-8] (9:10-12:00)	Ceremony of conferment of the honorary membership and prize awarding Special lecture meeting 14:00 ~ 17:00 at The 70th Anniversary Auditorium Banquet (18:30-20:30 Happo-en) [12,000yen]	(D) Controlling flow and physical property of solid, gas and liquid flow in blast furnace for low coke operation [D1-11] (9:30-16:40)	Fundamentals in iron ore reduction /Blast furnace operation [74-82] (9:00-12:10)			
Room2 W531	Development of utilization of steelmaking slag for improvement of coastal environment innovative program of ISIJ for advanced technology (9:00-12:00) [Charge-free]		(Int.) The metallurgical principle for the valorization of steelmaking slag [Int.1-12] (10:45-16:55)	Young engineer session of electric furnace /Refractories Slag-Dust treatment [83-89] (9:00-11:30)	Inclusion /Basic and applied technique of specialty steel refining [90-95] (13:00-15:10)		
Room3 W541			Fundamentals of sintering process /Operation of sintering plant [21-28] (9:10-12:00)	Fundamentals of coking /Young engineer session of coke-making [29-37] (13:30-16:40)	Converter /Secondary refining [96-102] (9:00-11:30)		
Room4 W611	Transport phenomena /Novel processing [9-14] (9:50-12:00)		Physico-chemical properties of melts at elevated temperature 1-2 [38-45] (9:00-11:50)	Physico-chemical properties of melts at elevated temperature 3-4-5 [46-56] (13:00-17:00)			
Room5 W621	Thermodynamics 1-2 [15-20] (9:40-11:50)		Solidification and structure control 1-2 [57-63] (9:30-12:00)	Inclusion behaviors in γ temperature range II 1-2 /Continuous casting-Solidification [64-73] (13:00-16:40)	Control and utilization of impurity in steel by solidification and microstructure formation process 1-2 [103-108] (9:30-11:40)	Conventional continuous casting [109-112] (13:00-14:20)	
Room6 W631			Contribution of smart ironmaking process based on active carbon recycling energy system (IACRES) on low-carbon society (10:00-17:00) [2,000yen]	(Int.) The meeting of arts and science in the history of ironmaking [Int.13-21] (9:00-16:00)			
Room7 W833	Slag: Recycle [113-117] (10:20-12:00)		Challenges for the development of advanced end-of-life vehicle recycling system for material industry (9:20-17:00) [1,000yen]	Effective use of unrecovered thermal energy in steelworks (9:30-12:00) [Charge-free]	Recovery of formland damaged 1-2 [118-124] (13:00-15:30)		
Room8 W932			(D) Advanced technologies of wireless sensor network for steel manufacturing process - Part2 [D12-15] (9:30-11:50)	(D) Co-creative risk management of man and systems to realize resilient systems [D16-24] (13:30-17:00)	Instrumentation 1-2 [125-131] (9:30-12:00)	Control /System [132-138] (13:00-15:30)	
Room9 W933	(D) Oxide Scale: Properties and influence in working processes [D25-30] (9:00-12:00)		Rolling /Cooling [146-152] (9:30-12:00)	(D) Rolling technology enabling the production with high efficiency and flexibility [D31-37] (13:00-16:40)	Visualization of welding process comparing to steel process 1-2 [167-173] (9:00-11:30)	13th ISIJ-JSSC Joint Symposium (12:40-16:30) [Member 2,000yen Non member 3,000yen]	
Room10 W934	Control technology for free cutting-VIII /Tools [139-145] (9:30-12:00)		Manufacturing technology of high quality and high functional bar and wire [153-157] (10:00-11:40)	Fracture characteristics /Joining and defect 1-2 [158-166] (13:30-16:50)	Prediction and measurement of residual stress in strip after leveling 1-2 [174-178] (9:30-11:40)	Processing technology for young researchers 1-2 [179-184] (13:00-15:10)	
Room11 W641			Hydrogen embrittlement 1-2 [212-218] (9:00-11:30)	Hydrogen embrittlement 3-4-5 [219-230] (13:00-17:20)	Heat resisting steel and superalloy 1-2 [279-286] (9:00-11:50)	Heat resisting steel and superalloy 3 [287-290] (13:30-14:50)	
Room12 W321	Deformation behavior 1 [185-189] (10:20-12:00)		Deformation behavior 2 /Formability [231-237] (9:00-11:30)	Dislocation behaviour /Deformation behaviour 3-4 [238-248] (13:00-17:00)	Hot-dip coating /Mechanism of corrosion and corrosion protection [291-297] (9:20-11:50)	Strip and sheet steel [298-300] (13:30-14:30)	
Room13 W323	Phase transformation 1-2 [190-195] (9:00-11:10)		Microstructure control 1-2 [249-256] (9:00-11:50)	Microstructure control 3-4 [257-264] (13:00-15:50)	ISIJ and JIM joint session Ultrafine grained materials- fundamental aspects for ultrafine grained structures - 1-2-3 [J19-27] (9:00-12:20)	Deformation behavior of DP steel [301-305] (13:00-14:40)	
Room14 W331	Simulation /Texture [196-201] (9:20-11:30)		Archives of 3D morphologies for innovative materials (9:00-17:00) [Charge-free]		Light elements in steels - principles and new perspectives of solute-solute and solute-defect interactions (10:15-16:00) [Charge-free]		
Room15 W242	Fatigue property [202-205] (10:40-12:00)		Stainless steels 1-2 [265-270] (9:20-11:30)	Application of stainless steel to thermal power plant (12:50-17:00) [Charge-free]	Stainless steel 3 [306-308] (10:30-11:30)	Current status of crystalline interface studies in iron and steel (13:00-16:00) [Charge-free]	
Room16 W351	Martensitic steel 1-2 [206-211] (9:00-11:10)		Electrical steel 1-2 [271-278] (9:00-11:50)	Effects of alloying elements on the migration of grain and phase boundaries in Fe alloys (13:00-16:45) [Charge-free]	Structural steels 1-2 [309-316] (9:00-11:50)	The 2nd symposium for creation of hydrogen-passive surface on steels for prevention of hydrogen embrittlement (13:00-16:10) [Charge-free]	
Room17 W935			Elemental analysis 1-2 [317-322] (9:00-11:10)	Characterization of microstructure in steels by compact neutron source (13:00-17:00) [Charge-free]	(D) Recent development of strain analysis techniques for steels [D38-43] (9:00-11:45)	Surface & state analysis 1-2 [323-328] (13:00-15:10)	
JIM RoomH S422					ISIJ and JIM joint session Titanium and titanium alloys 1-2-3-4-5 [J1-18] (9:00-16:30)		
JIM RoomB S223					ISIJ and JIM joint session Microwave processing 1-2 [J28-33] (9:50-12:00)		

[]: Lecture Number
(): Lecture Time
☞: Symposium Please ask to each of symposium room desks Directly.

■ Board Meeting:
Instrumentation, Control and System Engineering March 22 (Sat) 12:00-12:30 Room8
Processing for Quality Products March 22 (Sat) 12:00-13:00 Room10

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High Temperature Processes

Lecture No.			
Discussion Sessions	Title	Speaker	Page
Controlling flow and physical property of solid, gas and liquid flow in blast furnace for low coke operation			
D1	Current approach and problem in the future for low carbon blast furnace	S. Matsuzaki	1
D2	How to control melting phenomena in blast furnace aiming for low carbon operation	S. Ueda	3
D3	Reaction between iron oxide and gangue minerals under inert gas atmosphere	T. Miki	5
D4	The microstructure change and initial melting of iron ore sinter in blast furnace	K. Suzuki	7
D5	Trickle flow behaviors of liquid iron in the coke packed bed with molten slag	Y. Sasaki	10
D6	Analysis of liquid flow in a packed bed with structural boundary	T. Kon	14
D7	(ISIJ Research Promotion Grant) Evaluation of wetting behavior between Fe and carbonaceous material by sessile drop method with liquid sample injection system	K. Ohno	16
D8	Wettability between CaO-SiO ₂ -Al ₂ O ₃ -MgO melts and carbon substrates	S. Sukenaga	19
D9	Effect of calcium ferrite on the reduction disintegration behavior of sinter under high H ₂ atmosphere	T. Murakami	23
D10	Existence characteristic and composition of ash particle during combustion of pulverized coal	Y. Ueki	25
D11	Numerical analysis on passage and blockade behaviors of fine particles through an orifice consists of coarse particles	H. Nogami	27

Instrumentation, Control and System Engineering

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Advanced technologies of wireless sensor network for steel manufacturing process - Part2			
D12	Wireless sensor network for fatigue and corrosion monitoring in equipment diagnosis	M. Enoki	29
D13	Localization in blast furnace using wireless sensor network	T. Ohtsuki	33
D14	Vibration-driven energy harvesting	H. Kuwano	37
D15	Thermoelectric power generation modules for mid-to-high temperature waste heat recuperation	M. Ohtaki	41
Co-creative risk management of man and systems to realize resilient systems			
D16	Human-system co-creative risk management for establishing resilience against the disturbances	T. Sawaragi	44
D17	Progressive report of research group on "co-creative risk management to realize resilient systems"	H. Narazaki	48
D18	Operator guidance extraction based on an alarm model of experts	S. Kurahashi	50
D19	Experimental study on enhancing rule following behavior	M. Takahashi	54
D20	Collaborative sensing of environmental fluctuations for supporting organizational decisions	H. Mizuyama	58
D21	A design of driving agent for racing kart driving- Toward a co-creation approach for problem-solving -	H. Tamaki	60
D22	A natural evolution strategy for function optimization under uncertainty environments	I. Ono	64
D23	Evaluation of vulnerability of a supply chain taken alternative supply into account	I. Hatono	68
D24	Real-virtual fusion manufacturing systems adapting to environmental fluctuation- A proposal to cope with facility malfunctions -	N. Fujii	72

Processing for Quality Products

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Oxide Scale: Properties and influence in working processes			
D25	Effect of scale layer structure on blister formation	Y. Kondo	75
D26	Bending strength and fracture toughness of sintered Fe ₂ O ₃ at high temperatures	M. Nanko	79
D27	The modeling of heat transfer coefficient between die and middle carbon steel in hot forging	Y. Nakashima	80
D28	Discussion on reduction of friction of chrome steel covered with oxide scale in hot forging	R. Matsumoto	84
D29	Influence of scale thickness on scale deformation during hot rolling	H. Utsunomiya	86
D30	Effect of remained oxide scale in wire surface on drawing process	K. Suga	88
Rolling technology enabling the production with high efficiency and flexibility			
D31	High-quality and high-efficiency manufacturing technologies for high-tensile strength hot strip	Y. Washikita	89
D32	Numerical analysis of thermal crown in work roll shift mill	S. Yamaguchi	93
D33	Improvement of manufacturing efficiency by mill stabilizing device in hot rolling	H. Furumoto	96

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D36	Development of on-line forward slip ratio models on the tandem cold strip mill	Y. Fujii	• • •	108
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Process Evaluation and Material Characterization

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Recent development of strain analysis techniques for steels

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D41	Evaluation of line defect and planar defect character in metallic materials with large elastic anisotropy by X-ray line profile analysis	T. Seki	• • •	123
D42	Evaluation on microstructures of cold-rolled carbon steel by line profile analysis and the mechanical propertie	M. Kumagai	• • •	127
D43	Line-profile analysis of steel materials using synchrotron X-ray diffraction	S. Sato	• • •	131

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International Organized Sessions

The metallurgical principle for the valorization of steelmaking slag

10:45 ~ 10:50

Opening address S.Kitamura (Tohoku Univ.)

10:50 ~ 11:15

Int.1 (Invited Lecture) Current development and fundamental researches of ironmaking and steelmaking slag valorization in China

G. Li . . . 135

11:15 ~ 11:40

Int.2 (Invited Lecture) Alternative solidification of metallurgical slags for heat and energy recovery

D. Mudersbach . . . 139

11:40 ~ 12:00

Int.3 Development of a new heat recovery system from steelmaking slag

N. Shigaki . . . 143

13:15 ~ 13:40

Int.4 (Invited Lecture) Metal and energy recovery from metallurgical slags and residues
-An overview of pilot experiences at Swerea MEFOS

G. Ye . . . 145

13:40 ~ 14:00

Int.5 Extraction of Mn from steelmaking slag to produce Fe-Mn alloy

S.-J. Kim . . . 149

14:00 ~ 14:20

Int.6 Iron recovery from waste copper slag via smelting reduction process

J.H. Park . . . 153

14:30 ~ 14:55

Int.7 (Invited Lecture) Squeezing every bit of metal from EAF slags for valorization
-Controlled cooling eco technology (C²ET) -

I. Sohn . . . 157

14:55 ~ 15:15

Int.8 Separation of FeO and P₂O₅ from steelmaking slag by solid phase precipitation

T. Miki . . . 158

15:15 ~ 15:35

Int.9 Extraction of dicalcium silicate and tricalcium phosphate solid solution from steelmaking slag by leaching

S. Kitamura . . . 160

15:45 ~ 16:10

Int.10 (Invited Lecture) Stabilization of the AOD slag by hot stage processing

M. Guo . . . 164

16:10 ~ 16:30

Int.11 Development of new reforming process for steelmaking slag

M. Sakamoto . . . 168

16:30 ~ 16:50

Int.12 Construction of carbonation reaction model of steelmaking slag and carbonation reaction behavior analysis

A. Tatsumi . . . 172

16:50 ~ 16:55

Closing remark T.Miki (Tohoku Univ.)

The meeting of arts and science in the history of ironmaking

9:00 ~ 9:10

Introduction K.Nagata (Tokyo Univ. of the Arts)

9:10 ~ 9:50

Int.13 (Invited Lecture) Sir Henry Bessemer, FRS- father of modern steelmaking

K.C. Mills . . . 176

9:50 ~ 10:20

Int.14 Comparison of Finnish, Ethiopian and Japanese ancient ironmaking

E. Yamasue . . . 180

10:30 ~ 11:10

Int.15 (Invited Lecture) History of iron (and steel) making in Sweden

S. Seetharaman . . . 184

11:10 ~ 11:40

Int.16 Difficulty in chemical state analysis of Fe in high spin states using core hole spectroscopies

J. Kawai . . . 188

12:40 ~ 13:20

Int.17 (Invited Lecture) Kaman-Kalehöyük excavations in Central Anatolia, Turkey

S. Omura . . . 192

13:20 ~ 13:50

Int.18 High-energy X-ray fluorescence analysis of Japanese iron artifacts excavated at archaeological sites in Niigata prefecture

M. Tanaka . . . 194

14:00 ~ 14:40

Int.19 (Invited Lecture) Interplay between the arts and technology in ancient Indian metallurgical traditions

S. Ranganathan . . . 197

14:40 ~ 15:10

Int.20 The unique ironmaking process of Tatara using fine iron sand

K. Nagata . . . 201

15:10 ~ 15:40

Int.21 Manufacturing technique of steel chains used for Japanese armatures from the end of the *Muromachi* to the *Edo* period

N. Kugiya . . . 205

15:40 ~ 15:50

Concluding remarks S.Ranganathan (Indian Inst. of Science and National Inst. of Advanced Studies)

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15:50 ~ 16:00

Closing Speech M.Tanaka (Tokyo Univ. of the Arts)

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High Temperature Processes

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5	Influence of particle size of raw material iron ore on behavior of reactive coke agglomerate (Development of RCA, reactive coke agglomerate -5)	S. Kogure	• • • 213
6	Appling DEM simulation to blow-in operation of Kimitsu No.2 blast furnace	H. Michizono	• • • 214
7	Estimating gas permeability of softening sinter layer with mixed coke considering liquid phase	K. Ichikawa	• • • 215
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9	(ISIJ Research Promotion Grant) Kinetics of iron carburization via slag containing sulfur and phosphorus	H. Konishi	• • • 217
10	Characteristics of air cavity formed behind a sphere plunging into water	K. Katoh	• • • 218
11	Numerical simulation of gas-liquid dispersion behavior using multi-phase particle method	S. Natsui	• • • 219
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14	Collision between bubble and inclusion in molten steel under oscillating electromagnetic field	A. Maruyama	• • • 222
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16	Dissolution reaction of the rotating cylindrical graphite into Fe-36mol%Si alloy	T. Narumi	• • • 224
17	(ISIJ Research Promotion Grant) Hydrogen incorporation to Fe-light element alloys	H. Terasaki	• • • 225
18	(Mishima Medal) Application of computational thermodynamics to the control of non-metallic inclusions in steel	W. Yamada	
19	Activity of P ₂ O ₅ in 2CaO.SiO ₂ -3CaO.P ₂ O ₅ solid solution at 1873K	K. Goto	• • • 226
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Physico-chemical properties of melts at elevated temperature 3 · 4 · 5

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51	Effect of quartz cell on optical properties measurements of solid and liquid Sb ₂ Te ₃ by ellipsometry	H. Hanagiri	• • •	256
52	Epitaxial growth of AlN films on nitrided sapphire substrates using Ga-Al solution technique	M. Adachi	• • •	257
53	Development of activity determination method for Nd in Nd-Fe alloy by EMF measurement	D. Noguchi	• • •	258
54	(Sawamura Award) Effect of agitation on crystallization behavior of CaO-SiO ₂ -R ₂ O (R = Li, Na, or K) system characterized by electrical capacitance measurement	N. Saito	• • •	259
55	Simultaneous evaluation of viscous and crystallization behavior for super-cooled oxide melt	N. Saito	• • •	260
56	(ISIJ Research Promotion Grant) Quantitative analysis of crystallinity for super-cooled oxide melt by capacitance measurement	Y. Harada	• • •	261

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Continuous casting • Solidification

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- 73 Analysis of crystallographic orientation of austenite grains in unidirectionally solidified 0.2%C steel N. Ohura . . . 276

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- 75 Effect of iron ore characteristics on carburization and melting behavior of carbonaceous material and iron ore composite K. Owaki . . . 278
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Young engineer session of electric furnace

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- 84 Efficient utilization of chemical energy on the electric arc furnace R. Ishikawa . . . 287
- 85 Productivity improvements by uniform melting of scrap in Chita Plant EAF T. Ichikawa . . . 288

Refractories • Slag • Dust treatment

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- 87 In situ observation of oxidation process of natural flake graphite with laser microscope -Part2- Y. Saito . . . 289
- 88 Development of a monolithic refractory using spent refractories H. Sawada . . . 290
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Inclusion

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